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(71) Applicant *(for all designated States except US)*: S.B. CHEMICALS LIMITED [GB/GB]; Blaris Industrial Estate, Altona Road, Lisburn, Antrim BT27 5QB (GB).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)* : HALL, Sean, Geoffrey [GB/GB]; Grove Hill, 13 Dromore Road, Hillsborough, Down BT26 8HS (GB). McCULLINS, John, Thomas [GB/GB]; 15 Glencregagh Drive, Belfast BT6 0NJ (GB).

(74) Agent: EYLES, Christopher, Thomas; W.P. Thompson & Co., High Holborn House, 52-54 High Holborn, London WC1V 6RY (GB).

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(57) Abstract

A liquid built detergent composition comprises a substantially anhydrous organic liquid phase comprising a water-miscible organic solvent having uniformly distributed therein a non-ionic surfactant and an alkali metal salt of an anionic surfactant acid which contains one or more sulphonic acid groups, said organic phase having dispersed therein a finely divided particulate builder.

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LIQUID BUILT DETERGENT COMPOSITIONS

This invention relates to liquid built detergent compositions and to their production and use.

In recent times, mainly for reasons of manufacturing economics, aqueous heavy duty built liquid detergents have made in-roads into the spray dried washing powder market with the result that much work has taken place both in relation to the physics and also to the chemistry of product formulation. Such built liquid detergents are often sold in 2 litre plastics bottles. Typical of such products are those described in GB-B-2123846, GB-B-2153839, EP-B-0086614 and EP-B-0151884.

As a consequence of this commercial development the spray dried market sector has responded by the introduction of detergent concentrates which are very low in inert ingredients. This means that, without fillers and extenders, the product can be presented to the public with a so-called environmentally-friendly connotation and so that it can be claimed that in use the product is less polluting. This is because very much less product is used per washing machine load because of its strength. In addition the associated packaging can be significantly reduced in comparison to the traditional powder pack with a resulting saving in paper and board.

Another advance in detergent technology occurred when the heavy duty built liquid section of the market responded to the concentrated powder products. As a result there became available liquid detergent concentrates which are typically sold in 1 litre plastics bottles. In view of the greater detergent power of such concentrates the amount of concentrate needed for a typical washing machine load is often about one half of the volume of an aqueous heavy duty built detergent needed for laundering the same load of washing. Hence a 1 litre bottle of concentrate can be used

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to wash approximately as many loads of washing as a 2 litre bottle of a conventional aqueous heavy duty built liquid detergent. However, to date, this sector has basically been forced to formulate its products either as dispersions of inorganic builders in non-aqueous mixtures of non-ionic surfactants, as in EP-B-0030096 or EP-B-0120659, or as formulations of a non-ionic surfactant mixture in the emulsion state with a saturated solution of one or more builders using vegetable gums, or other emulsifying agents, as stabilisers, as in GB-A-2148926.

A problem arises with conventional non-aqueous built liquid detergent compositions which contain non-ionic surfactants as the sole class of surfactant in that they tend to gel upon dispersion in water.

In the case of GB-A-2148926 the surfactants in the emulsion are non-ionic surfactants whereas, in the case of EP-B-0120659, claim 9 cites the presence of an anionic surfactant in the composition but the specification completely omits to teach its use in any of its Examples. This omission is because it is difficult in commerce to acquire anionic surfactants, such as sodium dodecyl benzene sulphonate, in the non-pasty solid state (any that do exist are normally offered in admixture with sodium sulphate to prevent the material from being sticky and balling together into coarse agglomerates when mechanically mixed).

The prior art therefore does not make use of anionic surfactants in non-aqueous built detergent liquids and this is unfortunate because this class of detergent is one of the cheapest and most effective of all the commercially available surface active agents.

In the non-aqueous class of liquid built detergent the water analogue of the built system of, for example, GB-B-2153839, is the class of anhydrous solvents known as the polyethylene glycols (P.E.Gs). Liquid members of this

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class are those with a molecular weight between about 100 and about 600, commonly called PEG.100, PEG.200, PEG.300 and so forth.

It would be desirable to produce a non-aqueous heavy duty built liquid detergent composition with an anionic surfactant as an integral part of the liquid phase in which the builders are dispersed by either rod, bead or ball milling. It would further be desirable to produce such a detergent composition which does not gel upon dispersion in water.

The present invention accordingly seeks to provide a substantially anhydrous liquid built detergent composition containing an anionic surfactant. It further seeks to provide a substantially anhydrous liquid built detergent composition which shows little or no tendency to gel upon dispersion in water.

According to the present invention there is provided a liquid built detergent composition comprising a substantially anhydrous organic liquid phase comprising a water-miscible organic solvent having uniformly distributed therein a non-ionic surfactant and an alkali metal salt of an anionic surfactant acid which contains one or more sulphonic acid groups, said organic phase having dispersed therein a finely divided particulate builder.

The organic liquid phase is substantially anhydrous. In other words it is preferably devoid of added water and contains only that amount of water which is normally present in the ingredients used in production of the liquid built detergent composition of the invention. Hence a composition in accordance with the invention typically contains less than about 5% w/w water, more preferably less than about 2% w/w water, and even more preferably less than about 1% w/w water, based upon the total weight of the composition.

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The organic liquid phase may include a water-soluble organic solvent such as a lower molecular weight alcohol, for example an alkanol containing from 1 to 6, or more preferably 2 to 4 carbon atoms, such as ethanol, n-propanol, iso-propanol, n-butanol or the like. Another suitable class of water-soluble organic solvents is liquid water-soluble organic compounds containing two or more hydroxy groups. Examples of such compounds include ethylene glycol, propylene glycol, 1,4-butylene glycol, 1,5-pentamethylene glycol, glycerol, polyalkylene glycols such as polyethylene glycol, polypropylene glycol, and mixed polyoxyalkylene ether glycols, such as polyoxyethylene-polyoxypropylene glycols, as well as mixtures of two or more thereof.

A preferred type of water-soluble organic solvent is the polyethylene glycols, of which those having molecular weights of at least about 150, for example molecular weights in the range of from about 200 to about 600, are preferred. However, any solvent that is liquid at ambient temperatures and below (e.g. down to about -10°C), that is water miscible, and that will allow uniform distribution of the alkali metal salt of the anionic surfactant acid and of the builder can be used. Mixtures of water-soluble organic solvents can be used, if desired. For example, a mixture of an alkanol, such as ethanol or iso-propanol, and a polyethylene glycol can be used.

Normally it will be necessary to incorporate at most a minor amount only of an organic water-soluble solvent or of a mixture of organic solvents, for example, up to about 20% w/w of solvent based upon the total weight of the

composition. A preferred range is from about 1% w/w up to about 15% w/w of solvent based upon the total weight of the composition.

One of the purposes for which this solvent, if present, is added may be to adjust the viscosity of the composition to a desired value. A useful degree of control over the viscosity of the composition can be achieved, in particular, by addition of a glycol such as a polyethylene glycol (e.g. polyethylene glycol PEG 200).

As examples of alkali metal salts of surfactants there can be mentioned the sodium and potassium salts of anionic surfactant acids. Usually it will be preferred to incorporate a sodium salt of an anionic surfactant in the liquid built detergent concentrate of the invention on the grounds of cost.

As builder there can be used any of the known builders such as sodium metaphosphate, sodium paraphosphate, sodium tripolyphosphate, sodium silicate, sodium carbonate, a zeolite, a layer silicate, trisodium citrate, or a mixture of two or more thereof. It is beneficial to include an anhydrous material, such as anhydrous sodium carbonate, as an ingredient in the formulation of a non-aqueous liquid built detergent composition according to the invention because the anhydrous material absorbs water to form a solid hydrate of sodium carbonate. In this way any water present or formed in the composition, including water of neutralisation, can be absorbed and the substantially non-aqueous nature of the composition is retained, in addition to the sodium carbonate being available to act as an alkaline builder.

Examples of surfactant acids include alkyl benzene sulphonic acids, in which the alkyl group contains from about 6 to about 20 carbon atoms, for example from 10 to 14 carbon atoms, primary or secondary alkyl sulphonic acids

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containing from about 10 to about 26 carbon atoms, for example from 10 to 14 carbon atoms, and alpha-olefin sulphonic acids obtained by sulphonation of an alpha-olefin containing, for example from about 10 to about 22 carbon atoms, such as a C_{16} to C_{18} olefin or a mixture containing same. Besides a material containing a sulphonic acid group there may also be used for the production of the alkali metal salt or salts, usually in admixture with a material containing a sulphonic acid group, a sulphated fatty alcohol; typical sulphated fatty alcohols include those containing from about 10 to about 26 carbon atoms, for example a sulphated fatty alcohol mixture containing C_{10}, C_{12}, C_{14}, C_{16} and C_{18} fatty alcohols. Typical of such a fatty alcohol mixture is one containing alcohols in the following proportions: C_{10} 3.0%, C_{12} 57.0%, C_{14} 20.0%, C_{16} 9.0% and C_{18} 11.0%. Also there may be present a salt of a fatty ether sulphate, a typical example being sodium lauryl ether sulphate of the formula $R-(OCH_2.CH_2)_n-OSO_3^-Na^+$ wherein R is a C_{12} to C_{14} alkyl group and n is an integer of from 1 to about 20, or a mixture of salts of a fatty ether sulphate.

The composition of the invention includes one or more non-ionic surfactants. Typical non-ionic surfactants include fatty acid monoethanolamides such as coconut fatty acid monoethanolamide, a typical formulation for which is a mixture of monoethanolamides of fatty acids as follows: C_6 0.5%, C_8 6.5%, C_{10} 6.0%, C_{12} 49.5%, C_{14} 19.5%, C_{16} 8.5%, C_{18} (stearic) 2.0%, C_{18} (oleic) 6.0%, and C_{18} (linoleic) 1.5%. Other suitable non-ionic surfactants include polyoxyalkylene ethers of alkanols, typically polyoxyethylene ethers of alkanols containing typically 3 or more ethylene oxide groups, for example from about 6 to about 20 ethylene oxide residues and based upon alkanols containing from about 6 to about 26 carbon atoms. Mixed polyoxyethylene oxypropylene

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ethers of alkanols can also be used; these can also be based on C_6 to C_{26} alkanols and can contain from about 3 up to about 20 alkylene oxide residues, i.e. a mixture of ethylene oxide and propylene oxide residues. The alkanols and alkanol mixtures upon which such non-ionic surfactants are based can be produced by hydrogenation of methyl esters produced by transesterification of naturally occurring vegetable oils such as coconut oil, sunflower oil, palm oil, rape seed oil, and the like, or of animal fats, such as tallow or lard. A typical polyoxyethylene ether of an alkanol is based upon lauryl alcohol condensed with approximately 8 moles of ethylene oxide. Polyoxyalkylene ethers of alkylphenols are another type of non-ionic surfactant. Mixtures of non-ionic surfactants can be used.

The compositions of the present invention may include an amphoteric surfactant or a mixture of amphoteric surfactants. Typical amphoteric surfactants include dicarboxylated derivatives of oleic imidazoline, caprylo amphocarboxy glycinate, octyl imino dipropionate, octyl dimethyl betaine, complex coco iminodiglycinates, and fatty ampho polycarboxyglycinates. Often a mixture of amphoteric surfactant and non-ionic surfactant are present together in the compositions of the invention. The weight ratio of amphoteric surfactant to non-ionic surfactant may vary within wide limits, for example in the range of from about 1:100 to about 100:1.

Preferably a liquid built detergent composition according to the invention contains at least about 0.1% w/w of an alkali metal salt of an anionic surfactant acid up to about 20% w/w or more, e.g. up to about 25% w/w, even more preferably from about 2% w/w up to about 15% w/w, based on the total weight of said composition.

Preferably a liquid built detergent composition according to the invention comprises from about 2% w/w up to

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about 60% w/w of a builder or builders, even more preferably from about 5% w/w up to about 55% w/w, e.g. from about 15% w/w up to about 45% w/w or about 50% w/w of a builder or builders, based on the total weight of the composition.

Preferably a liquid built detergent composition according to the invention comprises from about 0.1% w/w up to about 20% or more of a non-ionic surfactant or surfactants, of an amphoteric surfactant or surfactants, or of a mixture of non-ionic and amphoteric surfactants, even more preferably up to about 35% w/w or more, e.g. up to about 50% w/w, most preferably from about 2% up to about 35% w/w, based on the total weight of the composition.

A liquid built detergent composition according to the invention may further comprise a bleach and, optionally, a bleach activator. Typically such a composition may contain from about 0.1% w/w up to about 10% w/w or more, e.g. up to about 15% w/w of a bleach and, optionally, from about 0.03% w/w up to about 3% w/w or more, e.g. up to about 5% w/w of a bleach activator, based upon the total weight of the composition.

Other minor ingredients which may be included in the composition of the invention include preservatives, optical brighteners, fragrances, foam depressants, foam boosters and/or stabilisers, soaps, dyes, pigments, buffers, corrosion inhibition agents, sequestration agents, anti-ingestion agents, humectants, enzymes, enzyme stabilisers, fabric softeners, fabric conditioners, and the like. One or more of these minor ingredients can be included in the compositions of the invention as appropriate. Such other minor ingredients typically comprise not more than about 5% w/w each of the compositions of the invention, for example in the range of from about 0.001% w/w up to about 2% w/w each based upon the total weight of the composition.

The compositions of the invention may be formulated

so as to have approximately the same laundering power as conventional aqueous heavy duty built liquid detergents. Preferably, however, the compositions of the invention will be formulated as concentrates which have several times, e.g. about 2 to about 5 times, the laundering power of conventional aqueous heavy duty built liquid detergents. To this end it is desirable to formulate the compositions as concentrates in which the solid components comprise in total at least about 30% w/w and preferably at least about 45% w/w up to about 50% w/w or even higher, based upon the weight of the composition.

The invention further provides a process for the production of a liquid built detergent composition which includes the step of reacting an anionic surfactant acid containing one or more free sulphonic acid groups in an organic liquid phase with an alkali metal hydroxide or alkoxide in the presence of a non-ionic surfactant. In this process the reaction is preferably conducted whilst agitating the reaction mixture. A builder can be dispersed in the resulting micellar concentrate by rod, bead or ball milling.

Hence the invention contemplates producing in-situ quantities of alkali metal salts of anionic surfactant sulphonic acids. By this means highly successful built liquids can be produced from solutions of a mixture of an anionic surfactant acid, such as dodecylbenzene sulphonic acid, a non-ionic surfactant, such as an alkylene oxide addition product, and PEG 200 (polyethylene glycol 200). From these materials very transparent pale yellow syrups can be produced which are excellent vehicles for carrying the silicate, carbonate, phosphate and polyphosphate builders which are to be micronised to give the non-aqueous built laundry liquids.

As an example of this technology the following

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solution was prepared:-

Dodecyl Benzene Sulphonic Acid	67.5 gms
Fatty Alcohol Ethoxylate (4 moles of E.O)	15.0 gms
Alkylene Oxide Addition Product (Marlox FK 64)	100.0 gms
Polyethylene Glycol 200	75.0 gms

(The word "Marlox" is a trade mark).

The above ingredients were simply stirred together in any order to give an amber syrup. This solution was then converted to the salt version of the sulphonic acid by titration with a solution of an alkali metal hydroxide or alkoxide.

A further series of similar syrups can be prepared by omitting the polyethylene glycol or the fatty alcohol ethoxylate.

In the course of our experiments we have surprisingly found that the described stock solution could be titrated to a pale yellow, transparent syrup by the use of alcoholic potash solution (potassium hydroxide dissolved in ethanol).

Although it is not intended that the validity of the present invention shall be jeopardised by the correctness or otherwise of the following explanation, it is believed that, during the non-aqueous titration, the micelles of the sulphonic acid are already associated with the micelles of the non-ionic surfactants and/or the alkylene oxide addition products and, when neutralised in this stage, remain as micelles in colloidal solution as the potassium salt. If this is indeed the case, then the neutralisation would not be expected to be as fast as the titration of the free sulphonic acid in alcohol or water solution. In fact it is found that the mixture remains slightly cloudy for some minutes after alkali addition but it soon clears and then much heat of neutralisation is developed. The resulting solution is syrupy and clear down

below 10°C and contains 26% of the salt.

When further aliquots of the afore-mentioned solution were titrated with 50% aqueous solutions of sodium and potassium hydroxide it was found that in all cases the syrups remained transparent and their alkali metal salts remained uniformly distributed in the mixture. The builder was then added.

When any of these syrups was mixed with a builder such as sodium tripolyphosphate (35%), sodium silicate "Soluble C" powder or sodium carbonate (5% each) and micronised by milling, the result was a fully built pourable liquid laundry detergent. All the other usual minor ingredients could be added and are compatible, including soaps which can be formed in-situ by having a fatty acid in solution in the mixture prior to titration with the alkali metal hydroxide or alkoxide.

The invention is further illustrated in the following Examples.

EXAMPLE 1

A liquid built detergent concentrate is produced from the following ingredients:-

	% w/w
Dodecyl Benzene Sulphonic Acid	11.5
Alkylene Oxide Addition Product (MARLOX FK 64)	12.0
Alcohol Ethoxylate (4 moles ethylene oxide)	3.0
Coconut Fatty Acid	5.2
Aqueous KOH solution (50% w/w)	4.2
Polyethylene Glycol (PEG 200)	12.0
Sub-total	47.9
Sodium Silicate (Soluble C powder)	5.0
Sodium Carbonate Anhydrous (Soda Ash)	5.0
Sodium Tripolyphosphate	39.3
Minor Ingredients	2.8
Sub-total	52.1
Total	100.0

All the organics are mixed together to yield a dark amber syrup. To this is added enough aqueous KOH solution for neutralisation; the approximate end point corresponds to the syrup colour becoming a lighter yellow. To this syrup are added all the other ingredients and the mixture is then micronised in a bead mill. In the resulting liquid built detergent concentrate, as in the products of the other Examples, the presence of the sodium carbonate is bifunctional in that it acts both as an alkaline builder in the product and also as a drying agent. This is because small quantities of water in the aqueous titration alkalies are absorbed in hydrate formation.

The term minor ingredients includes enzymes, fragrance, TiO_2, Bitrex (a trade mark) anti-ingestion agent, and optical brighteners.

EXAMPLE 2

The procedure of Example 1 is repeated except that a 50% aqueous sodium hydroxid solution replaces the aqueous potassium hydroxide of Example 1. The ingredients are as

follows:-

	% w/w
Dodecyl benzene sulphonic acid	11.5
Alkylene oxide addition product (Marlox FK64)	13.3
Alcohol ethoxylate (4 moles ethylene oxide)	3.0
Coconut fatty acid	5.2
Aqueous NaOH solution (50% w/w)	2.9
Polyethylene glycol (PEG 200)	12.0
Sub-total	47.9
Sodium silicate (Soluble C powder)	5.0
Sodium carbonate, anhydrous (Soda ash)	5.0
Sodium tripolyphosphate	39.3
Minor ingredients	2.8
Sub-total	52.1
Total	100.0

A similar liquid built detergent concentrate is produced. The minor ingredients has the same meaning as in Example 1.

EXAMPLE 3

A further liquid built detergent concentrate is produced except that, in place of the 4.2% w/w of 50% aqueous KOH solution used in Example 1, there is used a corresponding amount of an alcoholic solution of KOH (KOH dissolved in 90% ethanol).

EXAMPLE 4

The following ingredients are used to prepare a liquid built detergent concentrate:

	% w/w
Dodecyl Benzene Sulphonic Acid	11.5
Alkylene oxide addition product (MARLOX FK64)	12.0
Alcohol Ethoxylate (4 moles ethylene oxide)	3.0
Coconut Fatty Acid	5.2
Polyethylene Glycol (PEG 200)	12.0
Sodium Silicate Solution (47% w/w)	8.6
Sodium Carbonate Anhydrous (Soda Ash)	5.0
Sodium Tripolyphosphate	39.9
Minor Ingredients	2.8
Total	100.0

In this Example the sodium silicate acts not only as a builder but also as an alkali to neutralise the dodecyl benzene sulphonic acid. To prepare the product of this Example the first five listed ingredients are mixed together. Next, whilst continuing the mixture to high speed mixing conditions, the sodium silicate solution (Sodium Silicate Crystal 120H solution) is added. Then the resulting syrup is subjected to micronisation in a bead mill whilst adding the remaining ingredients. In this way the builders and the colloidal silicic acid that forms as a result of reaction between the dodecyl benzene sulphonic acid and the sodium silicate solution are micronised and uniformly dispersed in the resulting liquid built detergent concentrate.

As has already been mentioned the non-aqueous built anionic heavy duty laundry liquids of the invention are superior in washing qualities to those based on non-ionic and amphoteric systems simply because they contain the anionic surfactant species as the main part of the payload. Aqueous built anionic surfactants depend upon structured liquid systems as their supporting m dium for the inorganic builders and require the presence of water to the extent of

45% to 65% see, for example, the Examples of GB-B-2153839. This means that they cannot be transformed into liquid pourable concentrates because reductions in water content destroy the structured system of that class.

Further, from the user's point of view, a major advantage of the products of this invention is their compatibility with cold or hot water. When added to the charge in a washing machine the products are dispersible and soluble because of the ionic nature of the alkali metal salts whereas in the case of many of the built non-ionic preparations of the prior art they immediately gel on contact with wet surfaces and will not be homogeneously active until near the end of the wash cycle. This is an intrinsic property of anhydrous non-ionic surfactants.

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CLAIMS

1. A liquid built detergent composition comprising a substantially anhydrous organic liquid phase comprising a water-miscible organic solvent having uniformly distributed therein a non-ionic surfactant and an alkali metal salt of an anionic surfactant acid which contains one or more sulphonic acid groups, said organic phase having dispersed therein a finely divided particulate builder.

2. A liquid built detergent composition according to claim 1, in which said water-soluble organic solvent comprises a hydroxylic solvent selected from lower molecular weight alkanols and glycols.

3. A liquid built detergent composition according to claim 1 or claim 2, in which said water-soluble organic solvent comprises an alkanol containing from 2 to 4 carbon atoms, a polyethylene glycol having a molecular weight in the range of from about 150 to about 600, or a mixture thereof.

4. A liquid built detergent composition according to any one of claims 1 to 3, which comprises from about 1% w/w to about 20% w/w of said water-soluble organic solvent.

5. A liquid built detergent composition according to any one of claims 1 to 4, in which said alkali metal salt is a sodium or potassium salt.

6. A liquid built detergent composition according to any one of claims 1 to 5, in which said anionic surfactant acid comprises an alkyl benzene sulphonic acid in which the alkyl group contains from about 6 to about 20 carbon atoms, a primary or secondary alkyl sulphonic acid containing from

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a primary or secondary alkyl sulphonic acid containing from 10 to about 26 carbon atoms, an alpha-olefin sulphonic acid obtained by sulphonation of an alpha-olefin containing from about 10 to 22 carbon atoms, or a mixture thereof.

7. A liquid built detergent composition according to any one of claims 1 to 6, which comprises from about 0.1% w/w to about 25% w/w of said alkali metal salt.

8. A liquid built detergent composition according to any one of claims 1 to 7, in which said builder comprises sodium metaphosphate, sodium paraphosphate, sodium tripolyphosphate, sodium silicate, sodium carbonate, a zeolite, a layer silicate, trisodium citrate, or a mixture of two or more thereof.

9. A liquid built detergent composition according to any one of claims 1 to 8, which comprises from about 15% w/w up to about 60% w/w of said builder.

10. A liquid built detergent composition according to any one of claims 1 to 9, in which said non-ionic surfactant comprises a fatty acid monoethanolamide, a polyoxyalkylene ether of an alkanol, a polyoxyalkylene ether of an alkylphenol, or a mixture thereof.

11. A liquid built detergent composition according to claim 12 or claim 13, which comprises from about 0.1% w/w up to about 50% w/w of said non-ionic surfactant or surfactants.

12. A liquid built detergent composition according to any one of claims 1 to 11, which further comprises an amine salt of a sulphated fatty alcohol containing from about 10

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13. A liquid built detergent composition according to any one of claims 1 to 12, which further comprises a bleach.

14. A liquid built detergent composition according to claim 13, which further comprises a bleach activator.

15. A liquid built detergent composition according to claim 14, which comprises from about 0.1% w/w up to about 15% w/w of a bleach and from about 0.03% w/w up to about 5% w/w of a bleach activator.

16. A liquid built detergent composition according to any one of claims 1 to 15, which further comprises an enzyme.

17. A liquid built detergent composition according to claim 16, which further comprises an enzyme stabiliser.

18. A liquid built detergent composition according to any one of claims 1 to 17, which further comprises an amphoteric surfactant.

19. A process for the production of a liquid built detergent composition which includes the step of reacting an anionic surfactant acid containing one or more free sulphonic acid groups in an organic phase with an alkali metal hydroxide or alkoxide in the presence of a non-ionic surfactant.

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INTERNATIONAL SEARCH REPORT

International Application No PCT/GB 91/02084

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all)[6]

According to International Patent Classification (IPC) or to both National Classification and IPC

Int.Cl. 5 C11D17/00; C11D1/83

II. FIELDS SEARCHED

Minimum Documentation Searched[7]

Classification System	Classification Symbols
Int.Cl. 5	C11D

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched[8]

III. DOCUMENTS CONSIDERED TO BE RELEVANT[9]

Category [a]	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No.[13]
X	EP,A,0 340 965 (UNILEVER) 8 November 1989	1-3,5-6, 8-18
A	see the whole document	7
X	EP,A,0 395 976 (HENKEL) 7 November 1990 see the whole document	1-11,16
X	EP,A,0 253 151 (HENKEL) 20 January 1988	1-11, 13-14, 16-17
A	see page 4, line 1 - page 10, line 2; claims 1-7; examples	12
X	EP,A,0 361 646 (CLOROX) 4 April 1990	1-3, 5-11, 13-14,16
A	see page 3, line 45 - page 6, line 39; claims 1-13	12

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[a] Special categories of cited documents : [10]

"A" document defining the general state of the art which is not considered to be of particular relevance

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

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IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
08 APRIL 1992	23 APR 1992
International Searching Authority	**Signature of Authorized Officer**
EUROPEAN PATENT OFFICE	SERBETSOGLOU A.

Form PCT/ISA/210 (second sheet) (January 1985)

BNSDOCID: <WO 9209678A1 I >

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category °	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
X	EP,A,0 125 781 (INTEROX CHEMICALS LTD.) 21 November 1984 see page 19, line 13 - page 27, line 13; claims 38-42	1-3,6, 8-10, 12-14, 16,18
X	EP,A,0 034 387 (PROCTER & GAMBLE) 26 August 1981 see page 12, line 35 - page 13, line 3 see page 36, line 1 - page 39, line 27; claims 1-9	1-3, 5-16,18
A	GB,A,1 573 908 (LANKRO CHEMICALS LTD.) 28 August 1980 see the whole document	1-3,6, 10,19

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ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO. GB 9102084 SA 53510

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on 08/04/92
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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